

1.1 Competitive markets: Demand and supply

Learning Outcomes

- Outline the meaning of the term market.
- Explain the negative causal relationship between price and quantity demanded.
- Describe the relationship between an individual consumer's demand and market demand.
- Explain that a demand curve represents the relationship between the price and the quantity demanded of a product, *ceteris paribus*.
- Draw a demand curve.
- Explain how factors including changes in income (in the cases of normal and inferior goods), preferences, prices of related goods (in the cases of substitutes and complements), and demographic changes may change demand.
- Distinguish between movements along the demand curve and shifts of the demand curve.
- Draw diagrams to show the difference between movements along the demand curve and shifts of the demand curve.

Subject vocabulary

goods products that can be seen and touched

services products that cannot be seen or touched, such as a train journey and car insurance

consumer a person who buys a good

supplier a business that produces and sells goods

factors of production the inputs into the production process (land, labour, capital and entrepreneurship)

quantity demanded the amount of a good consumers are willing and able to buy at a given price over a given period of time

demand the amount of a good that consumers are willing and able to buy at each price

effective demand when a consumer is not only willing to buy a good but is also able to buy it

income effect of a change of price as price changes the quantity of a good that can be bought with the same income changes. Therefore as price changes quantity demanded changes.

substitution effect of a change in price as price changes some consumers switch some or all of their consumption of one good to a relatively cheaper substitute good

income the payment received by the factors of production (e.g. wages paid to labour, rent paid to the owners of land)

Synonyms

in person face-to-face

What is a market?

A market is where buyers and sellers meet in order to exchange money for **goods** and **services**. They do not always meet **in person**. Goods can be bought by **consumers** and sold by **suppliers** at on line markets such as Amazon and eBay. The amount of money a consumer pays the supplier in exchange for a good is called the price. There are markets for the **factors of production**. For example there is a market for labour (workers). Labour is needed by producers to make goods. The producers are the buyers of labour and individual people are the sellers of their own labour.

Why is there a negative causal relationship between price and quantity demanded?

Quantity demanded is the amount of a good that consumers are willing and able to buy at a given price over a given period of time. This means that consumers must not only want the good but also have enough money to be able to buy it and that the amount demanded is measured over a specific period of time such as a day, a week, or a year. When consumers are willing and able to buy the good **demand** is called '**effective demand**'.

The law of demand states that as price falls quantity demanded increases and as price increases quantity demanded falls. There is a negative or inverse relationship between price and quantity demanded.

There are two effects on quantity demanded of a change in price that explain the negative relationship: the **income effect** and the **substitution effect**.

What is the income effect?

As price falls the quantity of the good that can be bought with the same **income** increases. Therefore as price falls quantity demanded increases. As price increases the quantity of the good that can be bought with the same income falls. Therefore as price increases quantity demanded falls.

What is the substitution effect?

A substitute is a good that can be used in place of another good. As the price of a good falls it becomes relatively cheaper than the substitute good causing some consumers to buy the good in place of the substitute. As the price of a good rises it becomes relatively more expensive than the substitute good causing some consumers to buy the substitute good in place of the good. A change in price therefore leads to a change in quantity demanded.

Model sentence: There is a negative relationship between price and quantity demanded because of the income and substitution effects on quantity demanded of a change in price. The income and substitution effects explain the law of demand.

What is the difference between individual consumer demand and market demand?

The **demand schedule** is a table that shows the relationship between price and quantity demanded. Table 1.1 shows the quantity demanded by 4 individual consumers over a range of different prices. The last column shows the **market demand** which is the **sum** of the individual consumer's demand.

Price \$	Consumer 'a'		Consumer 'b'		Consumer 'c'		Consumer 'd'		Market demand
10	50	+	100	+	80	+	150	=	380
15	40	+	90	+	70	+	120	=	320
20	30	+	80	+	60	+	110	=	280

Table 1.1

Why does the demand curve represent the relationship between price and quantity demanded, *ceteris paribus*?

Price of potato chips (P)/\$	Quantity of potato chips demanded per week (Q)
2.50	5
2.00	10
1.50	15
1.00	20
0.50	25

The demand schedule (Table 1.2) shows quantity demanded at each price. Price is a **determinant of demand**. A change in price causes a change in quantity demanded.

Table 1.2 Demand schedule: potato chips

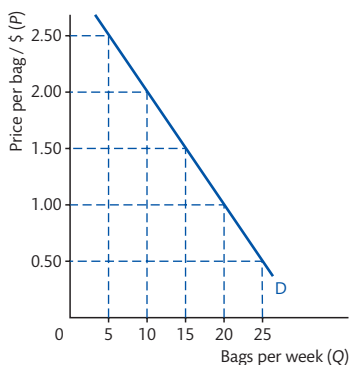


Figure 1.1

The **demand curve** is drawn using the information found on the demand schedule. The points are plotted on a graph. Price on the vertical axis and quantity demanded on the horizontal. The demand curve shows the relationship between price and quantity demanded, *ceteris paribus*. This Latin phrase means 'all other things being equal' or 'all other things being held constant'.

Why does a change in price cause a movement along the demand curve?

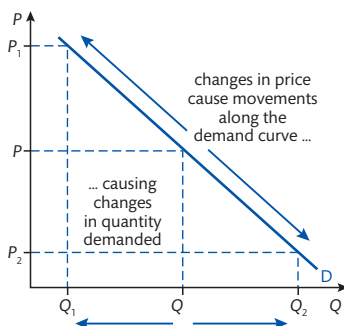


Figure 1.2

A change in the price of the good itself leads to a change in quantity demanded and causes a movement along the demand curve. An increase in price leads to a fall in quantity demanded and a movement up and along the demand curve. A fall in price leads to an increase in quantity demanded and a movement down and along the demand curve. Only a change in price causes a movement along the demand curve.

Model sentence: *Ceteris paribus* means **all other things being held constant**. All determinants of demand other than price are held constant in order to **isolate** the effect on quantity demanded of a change in price.

Subject vocabulary

demand schedule a table showing the quantity demanded over a range of prices – the information from which can be used to plot a demand curve

market demand the sum of the demand of the individual consumers in the market

determinants of demand factors that affect quantity demanded at each price

demand curve a graph that shows the relationship between price and quantity demanded

Synonyms

sum.....total

isolateseparate

Subject vocabulary

normal goods goods for which demand increases when income increases, and falls when income falls

inferior goods goods for which demand falls as income increases

complements goods that are used together

Glossary

steepness the height-size of the angle-gradient

What are the non-price determinants of demand and how do they affect demand for a good and cause a shift of the demand curve?

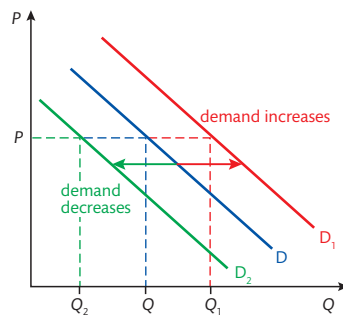


Figure 1.3

Income

Demand for **normal goods** increases as income increases.

The demand curve shifts up and to the right to show more is demanded at every price. Demand for **inferior goods** falls as income increases. The demand curve shifts down and to the left to show less is demanded at every price. Examples of normal goods are holidays and eating out. Examples of inferior goods might be second-hand cars and less expensive cuts of meat. Each consumer reacts differently to a change in income. What is an 'inferior good' for one person may not be for another.

Preferences/tastes/fashion

As a good becomes more fashionable demand increases. The demand curve shifts up and to the right to show that quantity demanded increases at every price. As it becomes less fashionable demand falls. The demand curve shifts down and to the left to show that less is demanded at every price.

The price of related goods

Substitutes are goods that can be used in place of another good. An increase in the price of beef leads to an increase in quantity demanded of lamb at every price and the demand curve for lamb shifts up and to the right.

Complements are goods that are used together. When the price of games consoles falls quantity demanded rises. More games consoles are sold. Demand for video games to use with the games consoles increases. More video games are demanded at every price. To show this the demand curve for video games shifts up and to the right.

Demographic changes

These are changes to the characteristics of the population, such as size and age structure. When the population increases quantity demanded for most goods increases at every price and the demand curve shifts up and to the right.

Model sentence: Only a change in the price of a good itself causes a movement along the demand curve illustrating a change in quantity demanded. A change in any other determinant of demand causes a shift of the demand curve illustrating a change in quantity demanded at every price.

Test your understanding of this unit by answering the following questions

- What is a market?
- Explain why a change in price leads to a change in quantity demanded.
- Why do economists use the phrase *ceteris paribus*?
- Distinguish between a movement along the demand curve and a shift of the demand curve.

Learning Outcomes

- Explain a demand function (equation) of the form $Q_d = a - bP$. (HL)
- Plot a demand curve from a linear function (e.g. $Q_d = 60 - 5P$). (HL)
- Identify the slope of the demand curve as the slope of the demand function $Q_d = a - bP$, that is $-b$ (the coefficient of P). (HL)
- Outline how a change in 'b' affects the **steepness** of the demand curve. (HL)
- Outline why, if the 'a' term changes, there will be a shift of the demand curve. (HL)

Explain how to plot a demand curve from a linear function and explain the cause of a change in the slope and a shift of the demand curve (HL)

A **linear function** is an equation that states how a **variable** is determined, the graph of which is a straight line. The **demand function** $Q_d = a - bP$ states how **quantity demanded** of a good is determined by the price of the good. 'Qd' is quantity demanded, 'a' is quantity demanded when price is zero. The **coefficient** 'b' determines the responsiveness of quantity demanded to a change in price and sets the slope of the **demand curve**, 'b' is negative in a demand function reflecting the fact that there is an **inverse relationship** between quantity demanded and price. As price increases quantity demanded decreases. 'P' is price. The demand function provides the information needed to plot a demand curve.

Calculate quantity demanded from a demand function – a step-by-step guide (HL)

Trouble shooter

This is how to calculate quantity demanded when price is €4 using the demand function $Q_d = 60 - 5P$ (5P means 5 multiplied by price)

$$Q_d = 60 - (5 \times P) \quad (\text{I have put } 5 \times P \text{ in brackets because I have to do this calculation first.})$$

$$Q_d = 60 - (5 \times 4) \quad \text{Simplify by multiplying 5 by 4}$$

$$Q_d = 60 - 20 \quad \text{Simplify by subtracting 20 from 60}$$

$$Q_d = 40$$

When price is €4 quantity demanded is 40 units.

A **demand schedule** is a table that shows the relationship between price and quantity demanded.

The calculations of quantity demanded at a range of prices using the demand function $Q_d = 60 - 5P$ are in the demand schedule Table 2.1.

Price €	$Q_d = 60 - 5P$	Quantity demanded
0	$Q_d = 60 - (5 \times 0) = 60 - 0 = 60$	60
1	$Q_d = 60 - (5 \times 1) = 60 - 5 = 55$	55
2	$Q_d = 60 - (5 \times 2) = 60 - 10 = 50$	50
3	$Q_d = 60 - (5 \times 3) = 60 - 15 = 45$	45
4	$Q_d = 60 - (5 \times 4) = 60 - 20 = 40$	40
5	$Q_d = 60 - (5 \times 5) = 60 - 25 = 35$	35
6	$Q_d = 60 - (5 \times 6) = 60 - 30 = 30$	30
7	$Q_d = 60 - (5 \times 7) = 60 - 35 = 25$	25
8	$Q_d = 60 - (5 \times 8) = 60 - 40 = 20$	20
9	$Q_d = 60 - (5 \times 9) = 60 - 45 = 15$	15
10	$Q_d = 60 - (5 \times 10) = 60 - 50 = 10$	10
11	$Q_d = 60 - (5 \times 11) = 60 - 55 = 5$	5
12	$Q_d = 60 - (5 \times 12) = 60 - 60 = 0$	0

Table 2.1

Price €	$Q_d = 60 - 10P$	Quantity demanded
0	$Q_d = 60 - (10 \times 0) = 60 - 0 = 60$	60
1	$Q_d = 60 - (10 \times 1) = 60 - 10 = 50$	50
2	$Q_d = 60 - (10 \times 2) = 60 - 20 = 40$	40
3	$Q_d = 60 - (10 \times 3) = 60 - 30 = 30$	30
4	$Q_d = 60 - (10 \times 4) = 60 - 40 = 20$	20
5	$Q_d = 60 - (10 \times 5) = 60 - 50 = 10$	10
6	$Q_d = 60 - (10 \times 6) = 60 - 60 = 0$	0

Table 2.2

Subject vocabulary

linear function an equation; the graph of which is a straight line

variable a value that can change

demand function an equation that shows how quantity demanded of a good is determined by the price of the good

quantity demanded the amount of a good consumers are willing and able to buy at a given price over a given period of time

coefficient a number used to multiply a variable by

demand curve a graph that shows the relationship between price and quantity demanded

inverse relationship a change in the value of one variable leads to an opposite change in direction in the value of the other variable. For example an increase in price leads to a fall in quantity demanded.

demand schedule a table showing the quantity demanded over a range of prices – the information from which can be used to plot a demand curve

Subject vocabulary

demand curve a graph that shows the relationship between price and quantity demanded

demand the amount of a good that consumers are willing and able to buy at each price

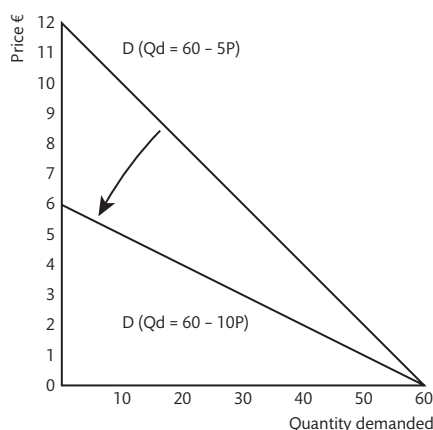


Figure 2.1

To illustrate the fact that quantity demanded is more responsive to a change in price when the value of 'b' is larger the demand curve rotates anti-clockwise from where the demand curves meet and becomes less steep.

Model sentence: A change in the value of 'b' changes the responsiveness of quantity demanded to a change in price and causes the slope of the demand curve to change.

How to shift the demand curve (HL)

Price €	$Q_d = 50 - 5P$	Quantity demanded
0	$Q_d = 50 - (5 \times 0) = 50 - 0 = 50$	50
1	$Q_d = 50 - (5 \times 1) = 50 - 5 = 45$	45
2	$Q_d = 50 - (5 \times 2) = 50 - 10 = 40$	40
3	$Q_d = 50 - (5 \times 3) = 50 - 15 = 35$	35
4	$Q_d = 50 - (5 \times 4) = 50 - 20 = 30$	30
5	$Q_d = 50 - (5 \times 5) = 50 - 25 = 25$	25
6	$Q_d = 50 - (5 \times 6) = 50 - 30 = 20$	20
7	$Q_d = 50 - (5 \times 7) = 50 - 35 = 15$	15
8	$Q_d = 50 - (5 \times 8) = 50 - 40 = 10$	10
9	$Q_d = 50 - (5 \times 9) = 50 - 45 = 5$	5
10	$Q_d = 50 - (5 \times 10) = 50 - 50 = 0$	0

Table 2.3

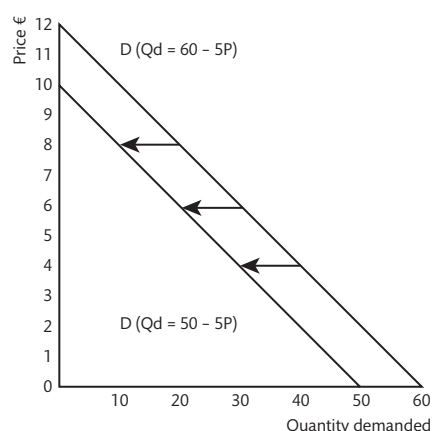


Figure 2.2

Now change the value of 'b' from 5 to 10 and calculate the quantity demanded using the function $Q_d = 60 - 10P$. These calculations are in the demand schedule Table 2.2. When 'b' = 5 quantity demanded falls by 5 units as price increases by €1. When 'b' = 10 quantity demanded falls by 10 units as price increases by €1. The higher the value of 'b' the more responsive quantity demanded is to a change in price.

The information from Tables 2.1 and 2.2 (page 5) is plotted to give the **demand curves** in Figure 2.1.

The value of 'a' in the demand function $Q_d = 60 - 5P$ changes from 60 to 50. The calculations of quantity demanded for the new demand function $Q_d = 50 - 5P$ are shown in the demand schedule Table 2.3.

The changes in quantity demanded caused by the change in the value of 'a' can be seen by comparing the information in Tables 2.1 and 2.3.

When the value of 'a' falls from 60 to 50 **demand** falls. Quantity demanded at every price is reduced by 10 units.

The demand curve shifts down and to the left in Figure 2.2 to illustrate the fall in demand.

Model sentence: A change in the value of 'a' causes a change in demand. An increase in the value of 'a' increases the quantity demanded at every price and the demand curve shifts up and to the right. A decrease in the value of 'a' causes a fall in quantity demanded at every price and the demand curve shifts down and to the left.

Subject vocabulary

continued from page 7

supply curve a graph that shows the relationship between price and quantity supplied

Test your understanding of this unit by answering the following questions

- Using the demand function $Q_d = 500 - 10P$ create a demand schedule for prices (\$) 0, 10, 20, 30, 40.
- Using a demand diagram to illustrate your answer explain the effect on demand of increasing the value of 'a' from 500 to 600.
- Explain how changing the value of 'b' affects the relationship between price and quantity demanded.

Synonyms

firm..... business/producer/
supplier

sum..... total

Learning Outcomes

- Explain the positive causal relationship between price and quantity supplied.
- Describe the relationship between an individual producer's supply and market supply.
- Explain that a supply curve represents the relationship between the price and the quantity supplied of a product, *ceteris paribus*.
- Draw a supply curve.
- Explain how factors including changes in costs of factors of production (land, labour, capital, and entrepreneurship), technology, price of related goods, expectations, indirect taxes and subsidies, and the number of firms in the market can change supply.
- Distinguish between movements along the supply curve and shifts of the supply curve.
- Construct diagrams to show the difference between movements along the supply curve and shifts of the supply curve.

What is the relationship between an individual producer's supply and market supply?

Tubs of vanilla ice-cream supplied per week					
Price £	Firm 1	Firm 2	Firm 3	Firm 4	Market supply
2	2000	500	3000	1500	7000
3	3000	1000	4000	3000	11000
4	4000	1500	5000	4500	15000
5	5000	2000	6000	6000	19000
6	6000	2500	7000	7500	23000

Table 3.1

The **supply schedule** Table 3.1 shows **quantity supplied** by the 4 individual **firms** at each given price. The **sum** of the individual firms' **supply** is the **market supply**.

Subject vocabulary

supply schedule a table showing the quantity supplied over a range of prices – the information from which can be used to plot a supply curve

quantity supplied the amount of a good that firms are willing and able to produce at a given price over a given period of time

supply the amount of a good that a firm is willing and able to produce at each price

market supply the sum of the supply of the individual firms in the industry

law of supply states that there is a positive causal relationship between price and quantity supplied. As price rises quantity supplied rises.

positive causal relationship a change in the value of one variable causes the value of the other variable to change in the same direction. For example an increase in price causes an increase in quantity supplied.

ceteris paribus Latin phrase meaning 'all other things being equal' or 'all other things being held constant'

resources the inputs into the production process, the factors of production

production the act of making goods and services

continued on page 6

Explain the positive causal relationship between price and quantity supplied

The **law of supply** states that there is a **positive causal relationship** between price and quantity supplied. As price rises quantity supplied rises. A change in price causes quantity supplied to change in the same direction. As price increases quantity supplied increases and as price falls quantity supplied falls. This is because a firm's main objective is to maximize profit. As price increases, *ceteris paribus*, profit increases therefore firms increase quantity supplied by switching **resources** away from the **production** of other goods so that they can produce more of the good that earns greater profit. As price falls profit falls *ceteris paribus* and firms reduce quantity supplied.

Model sentence: It is profit that motivates firms to produce goods. When profit earned from the sale of a good increases the firm increases quantity supplied and when profit falls it reduces quantity supplied.

Explain that a supply curve represents the relationship between the price and the quantity supplied of a product, *ceteris paribus*, and distinguish between a movement along and a shift of the supply curve

A change in the price of a good causes a movement along its **supply curve** (see Figure 3.1a on page 8). As the price of a good falls, *ceteris paribus*, profit falls. Resources are switched away from the production of the good causing a fall in quantity supplied and a movement down and along the supply curve. As price rises a firm increases quantity supplied causing a movement up and along the supply curve.

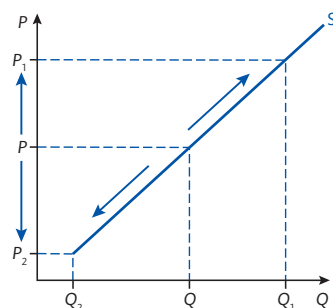


Figure 3.1a

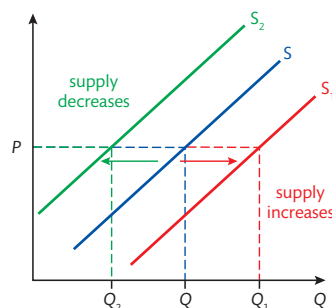


Figure 3.1b

Subject vocabulary

determinants of supply

factors that affect quantity supplied at each price

factors of production

the inputs into the production process (land, labour, capital and entrepreneurship)

costs of production

the amount the firm pays for the factors of production used to produce goods or services

quantity supplied

the amount of a good that firms are willing and able to produce at a given price over a given period of time

output the quantity of goods produced by a firm, industry or economy

input the resources used to produce goods

productivity the quantity of output per unit of input

resources the inputs into the production process, the factors of production

related goods goods that are linked in their use

substitutes in production

two or more goods that can be produced by a firm

industry a group of firms that produce the same or similar goods or services

market where buyers and sellers meet to exchange money for goods and services

market supply the sum of the supply of the individual firms in the industry

Synonyms

incentive.... encouragement/motivation

consumption.... use

What are the non-price determinants of supply and why do they cause a shift of the supply curve?

A change in any **determinant of supply** other than price leads to a change in the quantity supplied at each price and a shift of the supply curve. The non-price determinants of supply are explained here.

As the price of **factors of production** increase the **costs of production** increase and profit at each price decreases. A firm will reduce the **quantity supplied** at each price. The supply curve shifts to the left (Figure 3.1a). As costs of production decrease profit at each price increases and a firm will increase the quantity supplied at each price, causing the supply curve to shift to the right (Figure 3.1b).

Productivity is the quantity of **output** per unit of **input**. **Productivity** increases if fewer inputs are used to produce a given quantity of goods. As fewer **resources** are used, costs of production decrease and more profit is made. At each price more profit is made on each unit sold. The firm will increase the quantity supplied at each price causing the supply curve to shift down and to the right. Productivity decreases if more inputs are used to produce a given quantity of goods. Costs of production rise and profit falls. The firm reduces the quantity supplied at each price causing the supply curve to shift up and to the left.

A change in the price of a **related good** will lead to change in supply of the alternative good. A farmer can grow wheat and corn. They are **substitutes in production**. If the price of corn increases it becomes more profitable to produce. Higher profits on corn act as an **incentive** for the farmer to take factors of production away from the production of wheat and use them to produce more corn instead. There are two effects of doing this: the quantity supplied of corn increases as price rises and there is a movement up and along the supply curve for corn, and the quantity supplied of wheat decreases at each price and the supply curve for wheat shifts up and to the left.

The climate and natural disasters affect supply. The quantity supplied of grapes will decrease at each price if growing conditions are not suitable or if there is a disease of the crop. The supply curve shifts up and to the left.

As profits earned in an **industry** increase new firms will move into the industry attracted by the high profits. The number of firms producing the good increases, leading to an increase in the quantity supplied to the **market** at each price and the **market supply** curve shifts down and to the right.

An indirect tax, such as value added tax (VAT) and duty, is a tax placed on goods and services. The tax in effect increases the costs of production. As costs of production increase, profit at each price decreases and the firm will reduce the quantity supplied at each price and the supply curve shifts up and to the left.

A subsidy is a payment made by the government to a firm. The aim is to reduce price and increase **consumption** and supply. A subsidy in effect decreases costs of production. Profit at each price increases and the firm will increase the quantity supplied at each price. The supply curve shifts down and to the right.

Model sentence: A change in the price of a good leads to a change in quantity supplied of the good and a movement along its supply curve. A change in any other determinant of supply leads to a change in supply of the good and a shift of its supply curve.

Test your understanding of this unit by answering the following questions

- Explain why a change in price leads to a change in quantity supplied.
- Explain how a change in a non-price determinant of supply affects the amount of a good a firm wishes to produce.
- Distinguish between a movement along the supply curve and a shift of the supply curve.

Learning Outcomes

- Explain a supply function (equation) of the form $Q_s = c + dP$. (HL)
- Plot a supply curve from a linear function (e.g. $Q_s = -30 + 20P$). (HL)
- Identify the slope of the supply curve as the slope of the supply function $Q_s = c + dP$, that is d . (HL)
- Outline how a change in 'd' affects the steepness of the supply curve. (HL)
- Outline why, if the 'c' term changes, there will be a shift of the supply curve. (HL)

Explain the meaning of a supply function, plot a supply curve from a linear function and explain how a change in 'd' affects the steepness of the supply curve (HL)

The **supply function** $Q_s = c + dP$ is an equation that shows the relationship between price and quantity supplied. 'Qs' is quantity supplied, 'c' is quantity supplied when price = 0, the **coefficient** 'd' determines the **slope** of the **supply curve** and 'P' is price. The supply function $Q_s = c + dP$ is a **linear function** therefore the supply curve will be a straight line. dP is positive because as the price of a good rises, the quantity supplied also rises.

Calculate quantity supplied from a supply function (HL) – a step-by-step guide

Trouble shooter

How to work out quantity supplied when price is €4 using the supply function $Q_s = -30 + 20P$ (20P means 20 multiplied by price)

$$\begin{aligned} Q_s &= -30 + (20 \times P) && \text{(I have put } 20 \times P \text{ in brackets because I have to do this calculation first)} \\ Q_s &= -30 + (20 \times 4) && \text{Simplify by multiplying 20 by 4} \\ Q_s &= -30 + 80 && \text{Simplify by adding 80 to } -30 \\ Q_s &= 50 \end{aligned}$$

When price is €4 quantity supplied is 50 units.

The calculations of quantity supplied of cups of coffee per day in a cafe at a range of prices using the supply function $Q_s = -30 + 20P$ are shown in the **supply schedule** Table 4.1.

Price €	$Q_s = -30 + 20P$	Quantity supplied
0	$Q_s = -30 + (20 \times 0) = -30 + 0 = -30$	-30
1	$Q_s = -30 + (20 \times 1) = -30 + 20 = -10$	-10
2	$Q_s = -30 + (20 \times 2) = -30 + 40 = 10$	10
3	$Q_s = -30 + (20 \times 3) = -30 + 60 = 30$	30
4	$Q_s = -30 + (20 \times 4) = -30 + 80 = 50$	50
5	$Q_s = -30 + (20 \times 5) = -30 + 100 = 70$	70
6	$Q_s = -30 + (20 \times 6) = -30 + 120 = 90$	90

Table 4.1

The value of 'd' in the supply function $Q_s = -30 + 20P$ changes from 20 to 30. The new supply function $Q_s = -30 + 30P$ is now used to calculate quantity supplied. The calculations are shown in the supply schedule Table 4.2. The effects of this change on quantity supplied can be seen by looking at Tables 4.1 and 4.2. When 'd' = 20 quantity supplied increases by 20 units as price increases by €1. When 'd' = 30 quantity supplied increases by 30 units as price increases by €1. The higher the value of 'd' the more responsive quantity supplied is to a change in price.

Subject vocabulary

supply function equation that shows how quantity supplied of a good is determined by the price of the good

coefficient a number used to multiply a variable by

supply curve a graph that shows the relationship between price and quantity supplied

supply schedule a table showing the quantity supplied over a range of prices – the information from which can be used to plot a supply curve

linear function an equation; the graph of which is a straight line

Glossary

slope the angle/gradient of the curve

Subject vocabulary

supply the amount of a good that a firm is willing and able to produce at each price

Subject vocabulary

continued from page 11

excess supply occurs when quantity supplied is greater than quantity demanded

surplus occurs when quantity supplied is greater than quantity demanded, another term for excess supply

market clears when quantity demanded equals quantity supplied and there is no surplus or shortage

equilibrium price the price at which the quantity consumers are willing and able to buy is equal to the quantity firms are willing and able to produce

excess demand occurs when quantity demanded is greater than quantity supplied

shortage when quantity demanded is greater than quantity supplied (another term for excess demand)

Price €	$Q_s = -30 + 30P$	Quantity supplied
0	$Q_s = -30 + (30 \times 0) = -30 + 0 = -30$	-30
1	$Q_s = -30 + (30 \times 1) = -30 + 30 = 0$	0
2	$Q_s = -30 + (30 \times 2) = -30 + 60 = 30$	30
3	$Q_s = -30 + (30 \times 3) = -30 + 90 = 60$	60
4	$Q_s = -30 + (30 \times 4) = -30 + 120 = 90$	90
5	$Q_s = -30 + (30 \times 5) = -30 + 150 = 120$	120
6	$Q_s = -30 + (30 \times 6) = -30 + 180 = 150$	150

Table 4.2

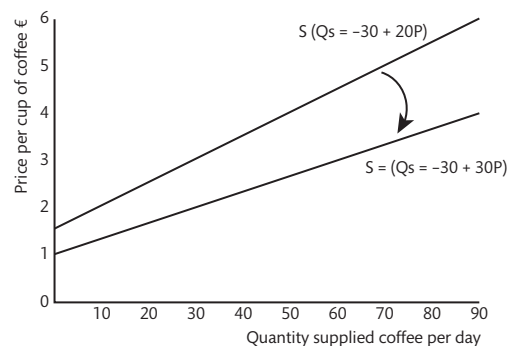


Figure 4.1

The information from the supply schedules in Tables 4.1 and 4.2 is plotted on a graph to give the supply curves in Figure 4.1. Quantity supplied is not plotted when it is negative so the first point plotted is where quantity supplied is zero.

To illustrate that quantity supplied is more responsive to a change in price the supply curve rotates clockwise from where they meet and the slope of the supply curve becomes less steep.

Model sentence: A change in the value of 'd' changes the responsiveness of quantity supplied to a change in price and causes the slope of the supply curve to change.

Outline why a change in the value of 'c' shifts the supply curve (HL)

Price €	$Q_s = -10 + 20P$	Quantity supplied
0	$Q_s = -10 + (20 \times 0) = -10 + 0 = -10$	-10
1	$Q_s = -10 + (20 \times 1) = -10 + 20 = 10$	10
2	$Q_s = -10 + (20 \times 2) = -10 + 40 = 30$	30
3	$Q_s = -10 + (20 \times 3) = -10 + 60 = 50$	50
4	$Q_s = -10 + (20 \times 4) = -10 + 80 = 70$	70
5	$Q_s = -10 + (20 \times 5) = -10 + 100 = 90$	90
6	$Q_s = -10 + (20 \times 6) = -10 + 120 = 110$	110

Table 4.3

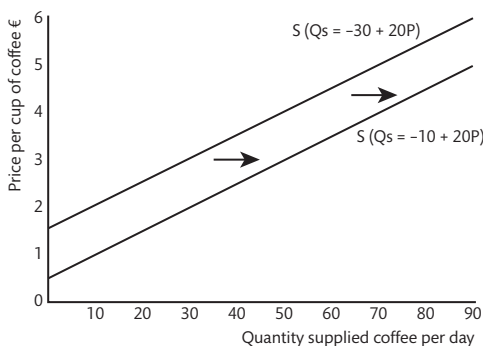


Figure 4.2

The value of 'c' in the original supply function $Q_s = -30 + 20P$ changes from -30 to -10. The calculations of quantity supplied from the new supply function $Q_s = -10 + 20P$ are shown in Table 4.3.

The quantities supplied at each price when 'c' = -30 and when 'c' = -10 are shown in Tables 4.1 and 4.3. As the value of 'c' increases by 20 from -30 to -10 the quantity supplied at each price increases by 20 units. The information from the supply schedules is plotted on a graph Figure 4.2. The supply curve shifts down and to the right to illustrate the increase in **supply**.

Model sentence: A change in the value of 'c' causes a change in the quantity supplied at each price. An increase in the value of 'c' causes an increase in quantity supplied at each price and the supply curve shifts down and to the right. A decrease in the value of 'c' causes a decrease in quantity supplied at each price and the supply curve shifts up and to the left.

Test your understanding of this unit by answering the following questions

- Using the supply function $Q_s = -40 + 200P$ create a supply schedule for prices €0, 10, 20, 30, 40 and 50.
- Using a supply diagram to illustrate your answer, explain the effect on supply of decreasing the value of 'c' in the supply function $Q_s = c + dP$.
- Explain how the value of 'd' in the supply function $Q_s = c + dP$ affects the relationship between price and quantity supplied.

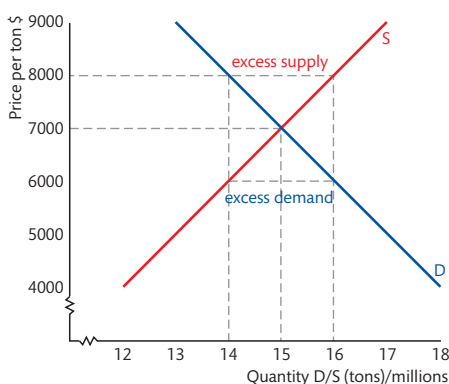
Synonyms**eliminate** ... remove/get rid of**Glossary****interact** affect each other/act together**Learning Outcomes**

- Explain, using diagrams, how demand and supply **interact** to produce **market equilibrium**.
- Analyse, using diagrams, and with references to excess demand or excess supply, how changes in the determinants of demand and/or supply result in a new market equilibrium.
- Calculate the equilibrium price and equilibrium quantity from linear demand and supply functions (HL only).
- Plot demand and supply curves from **linear functions**, and identify the equilibrium price and equilibrium quantity (HL only).
- State the quantity of excess demand or excess supply in the previous diagram (HL only).

Explain how demand and supply interact to produce market equilibrium

Table 5.1 is a **demand and supply schedule** for copper, a metal bought by firms. It is used in the **production** of many goods.

World supply and demand for Copper		
Price \$ per ton	Q _s (million)	Q _d (million)
4000	12	18
5000	13	17
6000	14	16
7000	15	15
8000	16	14
9000	17	13

Table 5.1**Figure 5.1**

At \$8000 quantity supplied = 16m tons and quantity demanded = 14m tons, an **excess supply** of 2m tons. Producers of copper must lower prices to **eliminate** the **surplus**. As price falls quantity demanded increases, causing a movement down and along the demand curve, and quantity supplied decreases causing a movement down and along the supply curve. Price continues to fall until the surplus is eliminated and the **market clears** at the **equilibrium price**.

At \$6000 quantity supplied = 14m tons and quantity demanded = 16m tons, an **excess demand** of 2m tons. When there is a **shortage** producers know they can get a higher price. As price increases quantity demanded decreases, causing a movement up and along the demand curve, and quantity supplied increases causing a

The market is in equilibrium at a price of \$7000 per ton where **quantity demanded = quantity supplied**. At prices other than \$7000 quantity demanded does not equal quantity supplied and the market is in **disequilibrium**. The **demand curve** and supply curve for copper are plotted in Figure 5.1.

Subject vocabulary

market equilibrium occurs when the quantity demanded of goods produced in an industry equals the amount of goods firms in the industry are willing to supply

linear function an equation, the graph of which is a straight line

demand schedule a table showing the quantity demanded over a range of prices – information that can be used to plot a demand curve

supply schedule a table showing the quantity supplied over a range of prices – the information can be used to plot a supply curve

production the act of making goods and services

quantity demanded the amount of a good consumers are willing and able to buy at a given price over a given period of time

quantity supplied the amount of a good that firms are willing and able to produce at a given price over a given period of time

disequilibrium occurs in a market where the quantity supplied does not equal the quantity demanded at the actual price

demand curve a graph that shows the relationship between price and quantity demanded

continued on page 10

movement up and along the supply curve. Price continues to increase until the equilibrium price is reached and the market clears.

Model sentence: When a market is in disequilibrium and there is excess demand or supply of the good the price must change in order to eliminate the excess. As price changes it leads to a change in quantity demanded and supplied and price continues to change until quantity demanded equals quantity supplied and the market clears.

Subject vocabulary

demand the amount of a good that consumers are willing and able to buy at each price

derived demand demand for a good, or factor of production, that is a consequence of the demand for something else

determinants of demand factors that affect quantity demanded at each price

normal goods goods for which demand increases when income increases, and falls when income falls

producer a business that makes goods

equilibrium quantity the output that results when quantity demanded is equal to quantity supplied

capital (goods) manufactured goods that are used in the production of other goods

productivity the quantity of output per unit of input

profit the difference between total revenue and total cost

supply the amount of a good that a firm is willing and able to produce at each price

widget a term used by economists for a non-specific unit of output. Often used when explaining an economic principle.

demand function an equation that shows how quantity demanded of a good is determined by the price of the good

Analyse how changes in non-price determinants of demand/supply cause an excess in the market and lead to a new equilibrium price

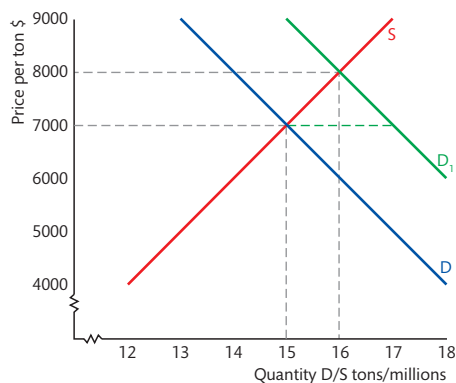


Figure 5.2

Copper is used in the production of many goods. **Demand** for copper is a **derived demand**. As incomes (a **determinant of demand**) increase demand for **normal goods** increases causing an increase in demand for copper. The demand curve shifts up and to the right as shown in Figure 5.2.

At \$7000 quantity supplied remains at 15m tons but quantity demanded increases to 17m. There is a shortage and **producers** know that they can get a higher price. As price increases quantity supplied increases causing a movement up and along the supply curve S and quantity demanded falls causing a movement up and along the demand curve D_1 . Price increases until the market clears at the new equilibrium price of \$8000 per ton and the new **equilibrium quantity** of 16m tons.

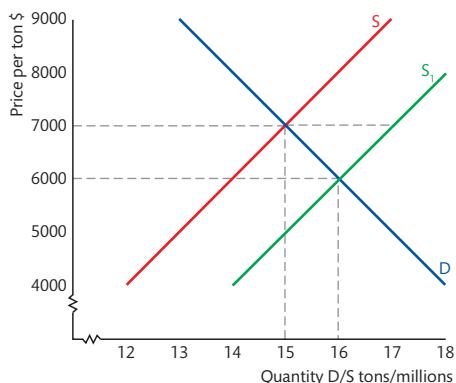


Figure 5.3

The producers of copper have bought more technologically advanced **capital** leading to greater **productivity**. Cost per ton falls and more **profit** is now made on the sale of a ton of copper. The producers increase **supply** and the supply curve shifts down and to the right as shown in Figure 5.3.

At the price of \$7000 quantity demanded remains at 15m tons but quantity supplied increases to 17m. In order to sell the surplus price must fall. As price falls quantity supplied decreases causing a movement down and along the supply curve S_1 and quantity demanded rises causing a movement down and along the demand curve D. Price falls until the market clears at the new equilibrium price of \$6000 per ton and the new equilibrium quantity of 16m tons.

Model sentence: A change in a non-price determinant of demand or supply causes the market to be in disequilibrium at the original equilibrium price. Price must change in order to eliminate the excess demand or excess supply and continues to change until the market clears at the new equilibrium price and equilibrium quantity.

Calculate the equilibrium price and quantity from linear functions (HL)

Below is set out the calculations of the equilibrium price and equilibrium quantity demanded and supplied of **widgets** from the **demand function** $Q_d = a - bP = Q_d = 100 - 10P$ and the supply function $Q_s = c + dP = Q_s = -20 + 20P$.

At equilibrium quantity demanded = quantity supplied.

Therefore at equilibrium $100 - 10P = -20 + 20P$ simplify by adding 20 to both sides of the equation.

$$20 + 100 - 10P = 20 - 20 + 20P$$

$$120 - 10P = 20P \text{ simplify by adding } 10P \text{ to both sides}$$

$$120 - 10P + 10P = 20P + 10P$$

$$120 = 30P \text{ simplify by dividing both sides by } 30$$

$$120/30 = 30P/30$$

$$4 = P. \text{ Equilibrium price} = \$4.$$

How to work out the equilibrium quantity.

Put 4 in the place of P in the demand function $Q_d = 100 - 10P$.

$$Q_d = 100 - (10 \times 4). \text{ I have put } 10 \times 4 \text{ in brackets because I have to do this calculation first.}$$

$$Q_d = 100 - 40$$

$$Q_d = 60 \text{ units}$$

The equilibrium quantity can be worked out using the supply function by putting 4 in the place of P in the supply function $Q_s = -20 + 20P$.

$$Q_s = -20 + (20 \times 4)$$

$$Q_s = -20 + 80$$

$$Q_s = 60 \text{ units}$$

The equilibrium price of widgets, given these supply and demand functions, is \$4 and the equilibrium quantity demanded and supplied is 60 units.

Calculate excess supply and the new equilibrium price using demand and supply functions (HL)

Costs of production are a **determinant of supply**. When costs of production increase, profit made on each unit sold falls and the firm reduces supply. The increase in the costs of production causes a change in the value of 'c' (the quantity supplied when price is zero), in the supply function $Q_s = c + dP$. Assume that the supply function changes from $Q_s = -20 + 20P$ to $Q_s = -50 + 20P$. Determinants of demand have not changed so the demand function remains $Q_d = 100 - 10P$.

The original **equilibrium price** is \$4. Quantity demanded at \$4 is 60 units. To calculate quantity supplied at \$4 put 4 in the place of P in the new supply function $Q_s = -50 + 20P$.

$$Q_s = -50 + (20 \times 4) \text{ simplify by multiplying } 20 \text{ by } 4$$

$$Q_s = -50 + 80$$

$$Q_s = 30 \text{ units}$$

At the price of \$4 quantity demanded = 60 and quantity supplied = 30. There is **excess demand** of 30 units ($60 - 30$) at the original equilibrium price. The firm knows it can get a higher price. Price rises in order to eliminate the **shortage**.

Calculate the new equilibrium price – a step-by-step guide

Trouble shooter

At equilibrium quantity demanded = quantity supplied therefore at equilibrium

$$100 - 10P = -50 + 20P$$

$$100 - 10P = -50 + 20P \text{ simplify by adding } 50 \text{ to both sides of the equation}$$

$$50 + 100 - 10P = 50 - 50 + 20P$$

$$150 - 10P = 20P \text{ simplify by adding } 10P \text{ to both sides}$$

$$150 - 10P + 10P = 20P + 10P$$

$$150 = 30P \text{ simplify by dividing both sides by } 30$$

$$150/30 = 30P/30$$

$$5 = P$$

Subject vocabulary

costs of production the amount the firm pays for the factors of production used to produce goods or services

determinants of supply factors that affect quantity supplied at each price

equilibrium price the price at which the quantity consumers are willing and able to buy is equal to the quantity firms are willing and able to produce

excess demand occurs when quantity demanded is greater than quantity supplied

shortage when quantity demanded is greater than quantity supplied (another term for excess demand)

The new equilibrium price = \$5. To find the new equilibrium quantity put 5 in the place of P in the demand function $Q_d = 100 - 10P$.

$$Q_d = 100 - (10 \times 5) \text{ simplify by multiplying 10 by 5}$$

$$Q_d = 100 - 50$$

$$Q_d = 50 \text{ units}$$

Put 5 in the place of P in the supply function $Q_s = -50 + 20P$.

$$Q_s = -50 + (20 \times 5) \text{ simplify by multiplying 20 by 5}$$

$$Q_s = -50 + 100$$

$Q_s = 50$ units. The new equilibrium price is \$5 and equilibrium quantity is 50 units.

Table 5.2 shows the calculations of quantity demanded and quantity supplied of widgets for the demand function and the two supply functions. The original equilibrium and the equilibrium after the change in the determinant of supply are highlighted. The decrease in the value of 'c' causes a fall in the quantity supplied at each price of 30 units.

Price \$	$Q_d = 100 - 10P$	Q_d	$Q_s = -20 + 20P$	Q_s	$Q_s = -50 + 20P$	Q
0	$Q_d = 100 - (10 \times 0)$ $= 100 - 0$	100	$Q_s = -20 + (20 \times 0)$ $= -20 + 0$	-20	$Q_s = -50 + (20 \times 0)$ $= -50 + 0$	-50
1	$Q_d = 100 - (10 \times 1)$ $= 100 - 10$	90	$Q_s = -20 + (20 \times 1)$ $= -20 + 20$	0	$Q_s = -50 + (20 \times 1)$ $= -50 + 20$	-30
2	$Q_d = 100 - (10 \times 2)$ $= 100 - 20$	80	$Q_s = -20 + (20 \times 2)$ $= -20 + 40$	20	$Q_s = -50 + (20 \times 2)$ $= -50 + 40$	-10
3	$Q_d = 100 - (10 \times 3)$ $= 100 - 30$	70	$Q_s = -20 + (20 \times 3)$ $= -20 + 60$	40	$Q_s = -50 + (20 \times 3)$ $= -50 + 60$	10
4	$Q_d = 100 - (10 \times 4)$ $= 100 - 40$	60	$Q_s = -20 + (20 \times 4)$ $= -20 + 80$	60	$Q_s = -50 + (20 \times 4)$ $= -50 + 80$	30
5	$Q_d = 100 - (10 \times 5)$ $= 100 - 50$	50	$Q_s = -20 + (20 \times 5)$ $= -20 + 100$	80	$Q_s = -50 + (20 \times 5)$ $= -50 + 100$	50
6	$Q_d = 100 - (10 \times 6)$ $= 100 - 60$	40	$Q_s = -20 + (20 \times 6)$ $= -20 + 120$	100	$Q_s = -50 + (20 \times 6)$ $= -50 + 120$	70

Table 5.2

Plot demand and supply curves from the linear functions and identify the excess, the equilibrium price, and equilibrium quantity (HL)

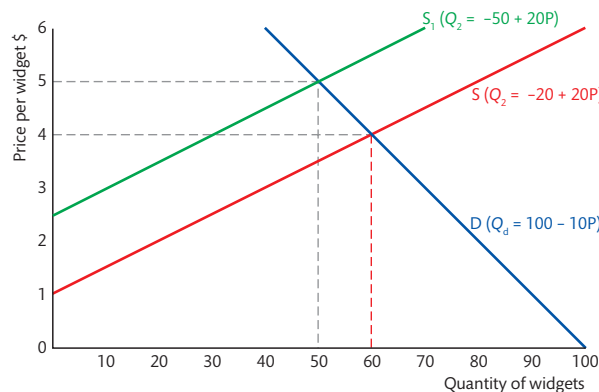


Figure 5.4

The **demand curve** and **supply curve** shown in Figure 5.4 are plotted from the information in Table 5.2. The change in the value of 'c' causes a shift of the supply curve up and to the left. At the original equilibrium price of \$4 there is now excess demand of 30 units. Price increases to eliminate the excess until the **market clears** at the new equilibrium price of \$5 and new equilibrium quantity of 50 units.

Subject vocabulary

demand curve a graph that shows the relationship between price and quantity demanded

supply curve a graph that shows the relationship between price and quantity supplied

market clears when quantity demanded equals quantity supplied and there is no surplus or shortage

Test your understanding of this unit by answering the following questions

- Using a diagram to illustrate your answer and with reference to a determinant of supply, explain the effect on equilibrium price and quantity of an increase in the supply of strawberries.
- Calculate equilibrium price and quantity from the demand function $Q_d = 1000 - 100P$ and the supply function $Q_s = -200 + 200P$.

The value of 'c' in the supply function falls to -500. Calculate the excess at the original equilibrium price and find the new equilibrium price and quantity.

Learning Outcomes

- Explain why scarcity **necessitates** choices that answer the 'what to produce?' question.
- Explain why choice results in an opportunity cost.
- Explain, using diagrams, that price has a signalling function and an incentive function, which result in a **reallocation** of resources when prices change as a result of a change in demand or supply conditions.

Why does scarcity mean that firms must make choices about what to produce and why does a choice result in an opportunity cost?

Resources are **scarce**. If a **firm** uses its resources to produce a good it cannot use them to produce a different good. The firm must choose what good to produce. Economists assume that a firm chooses to produce the good that earns the highest profit. (In reality firms have many objectives and maximizing profit is not always the primary objective. Alternative objectives will be discussed in a later unit.) In order to earn this profit the firm must **forgo** the profit it would have earned from producing a different good. The **opportunity cost** of doing something is the next best alternative forgone, therefore the opportunity cost of producing the good making the highest profit is the profit that would have been made from using the scarce resources to produce the good that earns the next highest profit.

Explain the rationing, signalling, and incentive function of price and explain how changes in price lead to a reallocation of resources

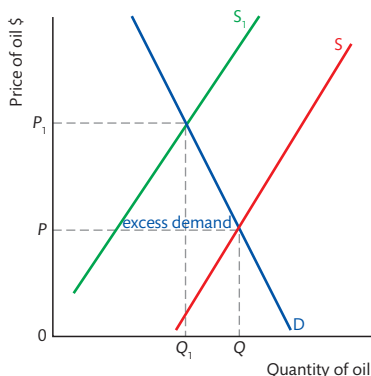


Figure 6.1

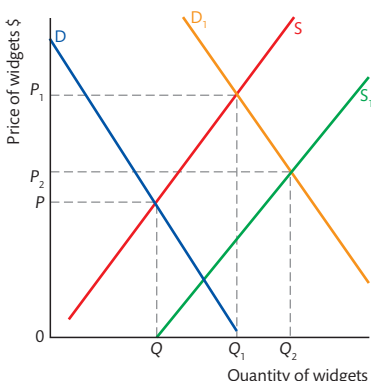


Figure 6.2

Increasing prices act as an incentive for consumers to reduce **consumption** leading to a movement up and along the new demand curve D_1 . The market clears where quantity demanded equals quantity supplied at the new equilibrium price P_1 and new **equilibrium quantity** Q_1 .

Firms outside the industry will be encouraged by the higher profits to reallocate resources to the production of widgets and enter the market. This causes the **market supply curve** to shift down and to the right from S to S_1 .

When **supply** of a resource such as oil (Figure 6.1) decreases, the supply curve **shifts** up and to the left from S to S_1 causing excess demand at equilibrium price P . Price increases to reflect the increasing scarcity of the good and as price rises the shortage is **eliminated**. The increase in price sends a **signal** to buyers to **ration** their use of the resource. **Quantity demanded** falls leading to a movement up and along the demand curve D and the resource is **conserved**. As the resource becomes scarcer the supply curve shifts further up and to the left and the excess demand becomes greater. Price must increase even further in order to eliminate the excess leading to greater rationing and conservation of the resource.

An **incentive** is something that motivates a producer or consumer to change behaviour. Figure 6.2 shows the demand and supply diagram for the market for widgets. Demand increases and the demand curve shifts up and to the right from D to D_1 . Price increases to in order to eliminate the excess demand at the equilibrium price P . As price increases, *ceteris paribus*, profit increases acting as an incentive for firms in the **industry** to **allocate** more resources to the production of the good in order to increase **quantity supplied**. This leads to a movement up and along the supply curve S .

Glossary

necessitates makes something necessary

conserved saved/used more sparingly

Synonyms

reallocation. redistribution

scarce..... limited/finite

firm..... business producer/supplier

forgo..... sacrifice/give up

shifts..... moves

eliminate.. remove/get rid of

signal..... sign/message

ration..... limit/restrict

incentive... encouragement/motivation

allocate..... distribute

consumption. use

Subject vocabulary

resources the inputs into the production process, the factors of production

opportunity cost the next best alternative forgone

supply the amount of a good that a firm is willing and able to produce at each price

quantity demanded the amount of a good consumers are willing and able to buy at a given price over a given period of time

industry a group of firms that produce the same or similar goods or services

quantity supplied the amount of a good that firms are willing and able to produce at a given price over a given period of time

equilibrium quantity the output that results when quantity demanded is equal to quantity supplied

market supply curve a curve that shows the total of the quantity supplied at each price by all firms in the market

Subject vocabulary

excess supply occurs when quantity supplied is greater than quantity demanded

consumer sovereignty occurs when firms allocate resources to the production of goods in accordance with the wants of consumers

ceteris paribus Latin phrase meaning 'all other things being equal' or 'all other things being held constant'

There is **excess supply** in the market at P_1 . Price falls to eliminate the excess. A fall in price leads to a fall in profit, thereby reducing the incentive to make the good, leading to a fall in quantity supplied and a movement down and along the supply curve S_1 . The fall in price sends a signal to consumers to increase quantity demanded, leading to a movement down and along the demand curve D_1 . The market clears at the new equilibrium price P_2 and equilibrium quantity Q_2 .

A change in the pattern of consumer demand causes excess demand or excess supply of goods produced by firms in different industries. Prices change to reflect the excesses in the markets, signalling to producers the change in consumer preferences. The change in profit caused by the change in prices provides the incentive for firms to alter the amount of resources allocated to the production of each good. In this way the factors of production are allocated to the production of goods in accordance with the wants of the consumer. This is **consumer sovereignty**. What is produced is determined by the wants of the consumer.

Model sentence: An increase in demand for a good causes a shortage of the good and price rises to eliminate it. The increase in price sends a signal to firms that consumers want more of the good. As price rises, **ceteris paribus**, profit earned on the sale of each unit of output rises thereby providing a greater incentive for firms to allocate more resources to the production of the good in order to increase quantity supplied.

Model sentence: A price increase sends a signal to consumers to use less of the good or leave the market altogether in order to ration their scarce income. Therefore quantity demanded falls. The higher price provides the incentive for the consumers to alter their behaviour and buy less of the good.

Learning Outcomes

- Explain the **concept** of consumer surplus.
- Identify consumer surplus on a demand and supply diagram.
- Explain the concept of producer surplus.
- Identify producer surplus on a demand and supply diagram.
- Explain that the best allocation of resources from society's point of view is at the **competitive market equilibrium**, where social (community) surplus (consumer surplus and producer surplus) is maximized.

Synonyms

concept(s) idea(s)/theory/ies

consumption use

firm business/producer/supplier

Subject vocabulary

competitive market equilibrium it is the level of output and price at which market demand is equal to market supply

consumer surplus the difference between the price a consumer is willing and able to pay and the price the consumer actually pays

producer surplus the difference between the price a firm is willing to accept for a unit of output and the price the consumer actually pays

consumer welfare a measure of the benefit obtained from the consumption of goods

unit of output a single good or service produced by a firm

What are consumer and producer surplus?

A consumer buys a cup of coffee. The price on the menu is \$3. The consumer is willing to pay as much as \$4 but actually pays \$3. The difference between the price the consumer is willing to pay and the price the consumer actually pays is called **consumer surplus**. The individual's consumer surplus is \$1 ($\$4 - \$3 = \1). The owner of the cafe might be willing to take \$2 for a cup of coffee but actually gets \$3. The difference between the actual price received and the price the seller is willing to take is called **producer surplus**. The producer surplus is \$1 ($\$3 - \$2 = \1).

What is the relationship between price, consumer surplus, and consumer welfare?

Consumer surplus is the additional benefit gained by the consumer from paying a price which is below the price the consumer is willing to pay. As price falls, *ceteris paribus*, the difference between the price the consumer is willing to pay and the price actually paid gets bigger, resulting in an increase in consumer surplus and therefore an increase in benefit. **Consumer welfare** is a measure of the benefit obtained from the **consumption** of a good. Therefore a fall in price and the following increase in consumer surplus represent a consumer welfare gain.

What is the relationship between price, producer surplus, and producer welfare?

Benefit gained for a producer is determined by the amount of profit earned from the sale of each **unit of output**. As price increases, *ceteris paribus*, profit increases and therefore the **firm's** benefit increases. Producer surplus is the additional benefit gained from receiving a price which is above the price the firm is willing to take. As price increases, *ceteris paribus*, the difference between the price the firm is willing to take and the actual price

received gets bigger leading to an increase in producer surplus and therefore an increase in benefit. **Producer welfare** is a measure of the benefit gained by a firm from the sale of goods. Therefore an increase in price and the following rise in producer surplus represent a producer welfare gain.

Model sentence: A change in price leads to a change in the difference between the price a consumer is willing to pay and the price actually paid, and in the difference between the price producers are willing to take and the price actually received, therefore as price changes consumer and producer surplus changes.

What are market consumer and market producer surplus?

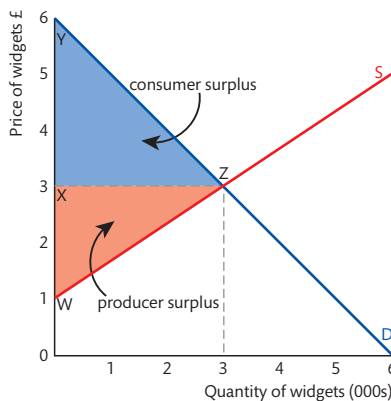


Figure 7.1

It can be read from the supply curve that some of the firms in the market are willing to supply widgets at prices below the equilibrium price of £3. At £1.50 firms are willing to supply 750 units per week. At £2.50 **quantity supplied** is 2250 units. Firms in the **industry** are willing to supply the 3000 units for less money than they actually receive. This is the producer surplus which is the additional benefit gained by the firms and represents the firms' welfare gain. Producer surplus is the area below the equilibrium price and above the supply curve labelled W, X, Z.

Why is society's welfare maximized at equilibrium point and why are resources allocated efficiently when markets are in equilibrium?

A competitive market is one that has lots of buyers and lots of firms. There are too many firms for them to **collude** and agree a price or output for the industry and, with so many firms and buyers, no buyer or firm acting on their own is big enough to influence total **market demand** or **market supply** and is therefore not able to affect **market price**.

Consumer surplus is the additional benefit gained by the buyer from paying a lower price than that which the consumer is prepared to pay. Therefore consumer benefit is **maximized** when consumer surplus is maximized.

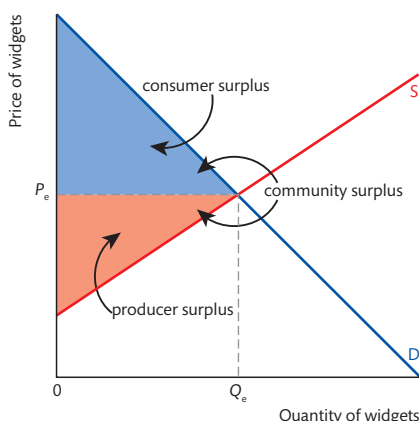


Figure 7.2

Figure 7.1 is a demand and supply diagram for a **widget**. The **equilibrium price** is £3 and the **equilibrium quantity** is 3000 units. We can read from the demand curve that at £4 consumers are willing to buy 2000 units. At £5 quantity demanded is 1000 units. Consumers are willing to pay more for the 3000 units than they actually pay. This is the market consumer surplus which is the additional benefit gained by all the consumers in the market. This represents their welfare gain. The consumer surplus is the area above equilibrium price and below the demand curve labelled X, Y, Z.

Producer surplus is the additional benefit gained by a firm from receiving a higher price than that which it is willing to take. Therefore producer benefit is maximized when producer surplus is maximized.

Community or **social surplus** is the **sum** of the additional benefit consumers and producers receive at a given price. Therefore society's benefit is maximized when the sum of consumer and producer surplus is maximized. **Welfare** is a measure of benefit therefore society's welfare is maximized when social surplus is maximized.

When the market is in **equilibrium** the sum of consumer surplus and producer surplus is maximized. Therefore society's welfare is maximized when the market is in equilibrium. The firms must **allocate** a

Subject vocabulary

producer welfare measure of the benefit gained by a firm from the sale of goods

widget a term used by economists for a non-specific unit of output. Often used when explaining an economic principle.

equilibrium price the price at which the quantity consumers are willing and able to buy is equal to the quantity firms are willing and able to produce

equilibrium quantity the output that results when quantity demanded is equal to quantity supplied

quantity supplied the amount of a good that firms are willing and able to produce at a given price over a given period of time

industry a group of firms that produce the same or similar goods or services

market demand the sum of the demand of the individual consumers in the market

market supply the sum of the supply of the individual firms in the industry

market price the price determined by the interaction of demand and supply in a competitive market

social surplus the sum of consumer surplus and producer surplus

welfare the benefit gained from consuming and producing goods

equilibrium a market is in equilibrium where the quantity supplied is equal to the quantity demanded

Glossary

collude come to a secret understanding

maximized made as great as possible

Synonyms

sum total

allocate distribute

Subject vocabulary

resources the inputs into the production process, the factors of production

production the act of making goods and services

allocative efficiency the best or optimal allocation of resources from society's point of view. It occurs when the market is in equilibrium and social surplus is maximized (where $P = MC$)

disequilibrium occurs in a market where the quantity supplied does not equal the quantity demanded at the actual price

specific quantity of **resources** to the **production** of this good in order to produce output at Q_e . This is the point of **allocative efficiency**. It is the best or optimal allocation of resources from the point of view of society because welfare is maximized at the equilibrium point Q_e, P_e .

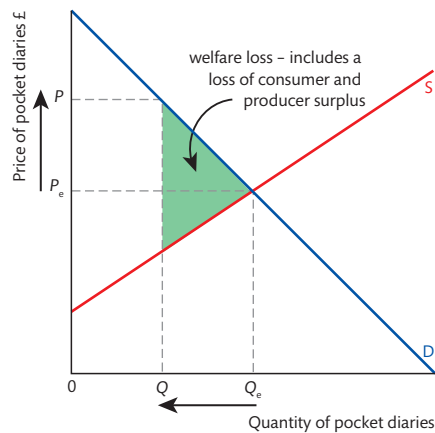


Figure 7.3

Model sentence: An efficient allocation of resources occurs when the market is in equilibrium and social surplus is maximized.

When there are only a few firms in the industry they are able to collude. The firms can agree to set a higher price in order to increase producer surplus. We can see in Figure 7.3 that as price increases from P_e to P , quantity demanded falls from Q_e to Q . The industry reduces output from Q_e to Q . Fewer resources are now allocated to the production of this good. At P the market is in **disequilibrium**. Quantity demanded does not equal quantity supplied. The community or social surplus is now smaller. The loss of social surplus is represented by the shaded area in the diagram. There is a loss of welfare when price is above equilibrium price. It is allocatively inefficient. More resources need to be allocated to the production of this good in order to maximize social surplus and society's welfare.

Test your understanding of this unit by answering the following questions

- Using a diagram to illustrate your answer, explain what happens to consumer surplus when price increases.
- Using a diagram to illustrate your answer, explain what happens to producer surplus when price falls.
- Explain why there is a welfare loss when price is greater than equilibrium price.
- Explain why allocative efficiency occurs at equilibrium point in a competitive market.